

as a vector of more than 100 plant viruses. For the UK, *B. tabaci* poses a threat primarily to protected vegetable crops due to the transmission of plant-pathogenic viruses. There are at least 24 different biotypes of *B. tabaci* that cannot be differentiated through morphological traits. The B (Middle East-Asia Minor 1 species) and Q (Mediterranean species) biotypes are widely considered to be the most important and, as such, the ability to rapidly and precisely biotype *B. tabaci* interceptions is vital when developing effective control strategies. Intercepted adult/pupal *B. tabaci* received from the UK Plant Health and Seeds Inspectorate during 2002-2003 (n=60) and 2010-2011 (n=42) were biotyped using a real-time PCR assay based on TaqMan® chemistry. The positive results indicated that during 2002-2003 the Q biotype comprised 68.3% of the interceptions whilst in 2010-2011 it comprised 66.7% of the *B. tabaci* samples intercepted. The implications in regards to pest management of the insect are discussed.

P070 Contingency planning for Small hive beetle *Aethina tumida* in the UK: using entomopathogenic nematodes as control agents against larvae [MONDAY]

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The Small hive beetle (*Aethina tumida*) is an endemic parasitic pest and scavenger of colonies of social bees indigenous to sub-Saharan Africa. In this region the beetles rarely inflict severe damage on strong colonies since the bees have developed strategies to combat them. However, *A. tumida* has since 'escaped' from its native home and has recently invaded areas such as North America and Australia where its economic impact on the apiculture industry has been significant. Commercially available entomopathogenic nematodes within the UK were screened for their potential to control beetle larvae. The nematodes *Steinernema kraussei* and *S. carpocapsae* provided excellent control with 100% mortality of larvae being obtained. A dose rate of *S. kraussei* at 2,500 IJ/ml still provided complete larval mortality. Delayed applications of the nematodes following larvae entering sand to pupate also provided excellent control for up to 3 weeks. Evidence that the nematodes could still enter pupating larvae after 3 weeks in the ground was obtained. The information gained supports the development of contingency plans to deal with *A. tumida* should it occur in the UK.

P071 Urban warming trumps natural enemy regulation of herbivorous pests [THURSDAY]

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Trees provide services that are essential to urban habitats. Unfortunately, herbivorous arthropods are often more abundant and damaging on urban than rural trees. Previous research has attributed elevated urban herbivore abundance to decreased regulation by natural enemies. However, cities are also warmer than surrounding natural areas. We ask how urban habitat characteristics influence temperature and natural enemy abundance, in regulating abundance of an urban forest pest, the gloomy scale, (*Melanaspis tenebricosa*). We used a surface temperature map to select red maple trees (*Acer rubrum*) at warmer and cooler sites in Raleigh, NC where we measured impervious surface cover, local vegetation complexity, and landscape scale vegetation cover. Using path analysis, we determined that impervious surface increases scale insect abundance by increasing temperature, rather than by reducing natural enemy abundance or efficacy. We found that increasing temperature significantly increases scale insect fecundity and population growth. A 2° C increase in temperature resulted in three orders of magnitude more scale insects and trees in significantly worse condition. These results support predictions that urban and natural forests will face greater herbivory in the future, and suggest a primary cause could be

direct, positive effects of warming on herbivore fitness rather than altered trophic interactions.

P072 Ecological characteristics of populations of pest species of Indian curculionids (Coleoptera: Curculionidae) [MONDAY]

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The family Curculionidae is the largest family of superfamily Curculionoidea. The family includes weevils which can be recognised by their pronounced rostrum. These weevils are an economically important group of Coleoptera that along with other families in the superfamily curculionoidea have long snouts with chewing mandibles. These weevils use the snouts to feed internally on plant tissues and are associated with variety of flora. The study has been made by observing the type of flora of different regions for working out the possible co-relation of the concerned species with biotic and abiotic factors. Allopatric and Sympatric occurrence of the species has shown promising relationships which are likely to be proved extremely useful in establishing ecological patterns of distributions. The various aspects which were studied to correlate their ecological characteristics with behavioural pattern pertaining to the amount of host plant range, seasonal prevalence and population structure will be highlighted.

P073 Olfactometer screening of repellent essential oils against the pollen beetle (*Meligethes spp.*) [THURSDAY]

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Essential oils can have an impact on pollen beetle (*Meligethes spp.*) host plant location behaviour. Lavender oil (*Lavandula angustifolia*) showed the highest repellency value in a laboratory study that compared five different essential oils (Mauchline *et al.*, 2005). However, lavender oil is one of the most expensive essential oils – a fact that could seriously hamper on-farm implementation of this strategy. To find a cheaper essential oil with comparable efficacy to lavender oil, we compared the essential oils of *Mentha arvensis*, *Eucalyptus globulus*, *Melaleuca alternifolia*, *Citrus sinensis*, *Citrus paradisi*, *Citrus limon*, *Juniperus mexicana*, *Abies sibirica*, *Illicium verum*, *Gaultheria procumbens*, *Cymbopogon flexuosus*, *Syzygium aromaticum*, and *Litsea cubeba* using a Y-tube-olfactometer. Essential oils were diluted 1:10 in acetone and 40 µl of the dilution were applied on a filter paper. Filter papers were placed in the odour containers of the olfactometer together with a flower cluster of spring oilseed rape. The control treatment involved filter papers treated only with acetone. Hungry pollen beetles were released individually into the olfactometer. The beetles' choices were recorded. Flowers and essential oils were changed between replicates. Six replicates with six beetles each were conducted. Highest repellency values were obtained for *Mentha arvensis*, *Cymbopogon flexuosus*, and *Litsea cubeba*.

P074 Withdrawn

P075 Observations on some biological aspects of *Cicadatra persica* (Cicadidae: Hemiptera) in apple fruit orchards in Erneh, Syria [MONDAY]

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Cicadatra persica Kirkaldy 1909 (Hemiptera: Cicadidae) is regarded

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ABSTRACTS

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